ELVIS ASCENDS — The special shape balloon "Aaron" (Elvis's middle name) rises into the morning sky during the 2012 Albuquerque International Balloon Fiesta. (Photo by Randy Montoya)

Sandia's 2012 ECP campaign kicks into high gear

AARON BRUNDAGE (5431) volunteers for Big Brothers, Big Sisters. He encourages Sandians to join him in supporting this year's ECP campaign. See related stories on **pages 6-7.**

Sandia LabNews

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Sandia National Laboratories

Federal Laboratory Consortium tips hat to wide range of Sandia work

By Nancy Salem

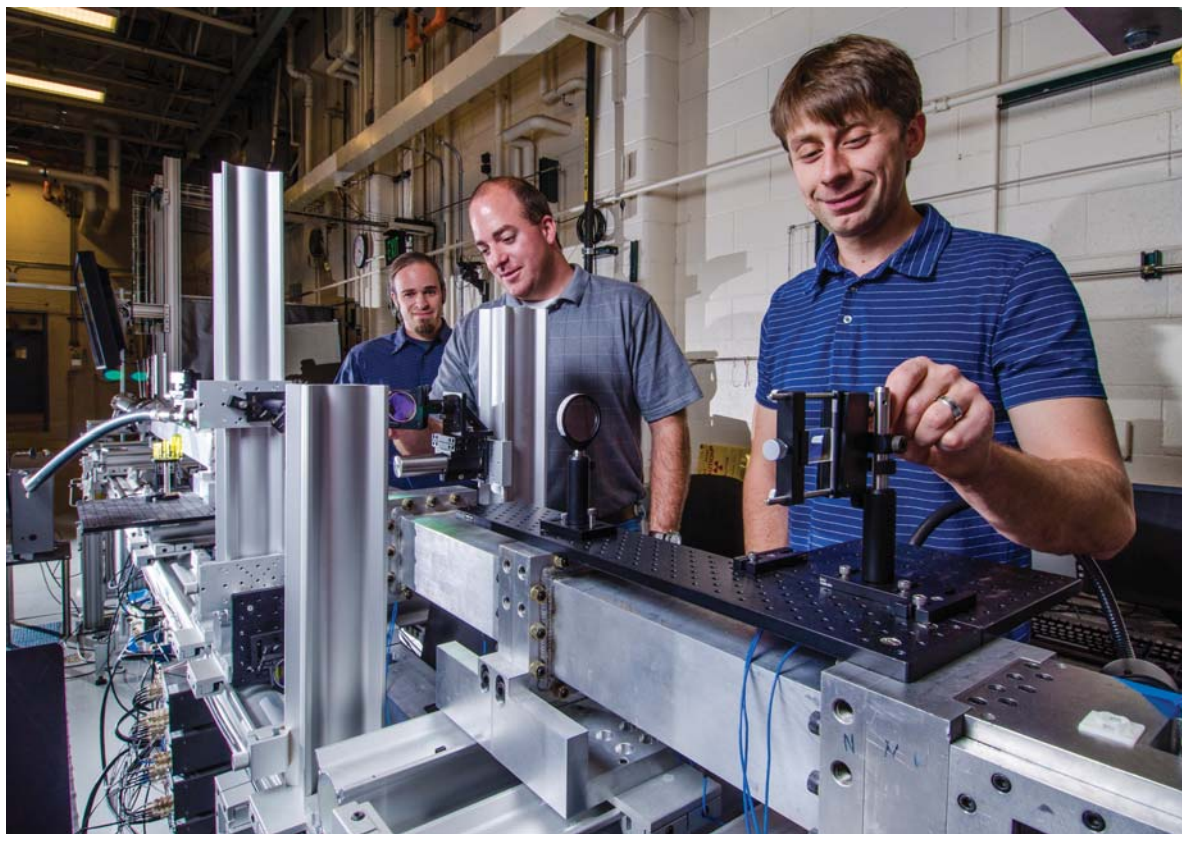
Sandia was honored four times by the Federal Laboratory Consortium (FLC) for its work to develop and commercialize innovative technologies.

The FLC's Far West/Mid-Continent regional awards recognized Sandia's technology transfer work with crystalline silico-titanates (CSTs), biomimetic membranes, DAKOTA software, and the i-Gate Innovation Hub.

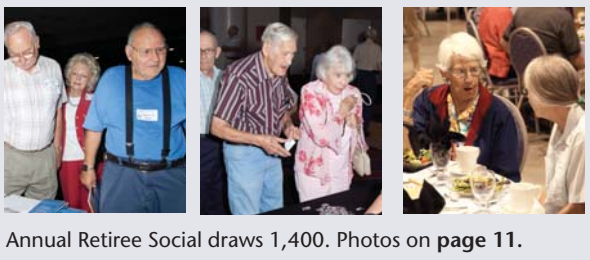
"It is always gratifying when the Federal Laboratory Consortium shines a light on the amazing work that is taking place at Sandia National Laboratories," says

(Continued on page 4)

Sandia's multiphase shock tube



UNIQUE MACHINE — Steve Beresh (1515), Sean Kearney (1512), and Justin Wagner (1515), left to right, are part of a team that developed Sandia's multiphase shock tube. The 22-foot-long machine, which uses various diagnostics, makes it possible to study how densely clustered particles disperse during an explosion. For more about the device and its capabilities, see the story by Sue Major Holmes on **page 5.** (Photo by Randy Montoya)



Annual Retiree Social draws 1,400. Photos on **page 11.**

Inside . . .

Celebrating Hispanic Heritage

More than 600 people attended the Hispanic Heritage Diversity Awareness Event at Hardin Field this month, enjoying music, food, and fellowship. Story and photos on page 12.

That's that

When I first started at Sandia in the mid-1990s, our Advanced Manufacturing group was using this super whizz-bang technology, something new under the sun, called 3-D printing, to do rapid prototyping of engineering designs. The technology made it possible, by laying down layer upon layer of quick-setting resins, to "print" full, three-dimensional models of machine parts, gears, rods, armatures, cams, linkages, and so on. You could go from a CAD drawing to a full-scale model in a few hours rather than the few days or even weeks it might otherwise take to manufacture a prototype. The advantages for testing alternative designs were obvious. If a part didn't fit right or just didn't work the way you thought it would, you could refine the model on the fly and print a new version.

To me, new to Sandia and starry-eyed at the incredibly cool stuff we were doing, this was just about the neatest thing I'd ever seen. When I expressed my amazement, the PI for the work said, in effect, "You ain't seen nothin' yet." The technology, which was only available to institutions with the resources of a national laboratory like Sandia in 1995, would soon be commonplace. Before long, he said, everybody would have a little "Mr. Factory" right on the desk in their den.

Yeah, right, I thought. It'll be available, I figured, about the same time the "Mr. Fusion Home Energy Reactor" from *Back to the Future* hit the store shelves. Or the flux capacitor.

But, to borrow a phrase from Doc Brown: Great Scott! Three-D printing — Mr. Factory, if you will — has indeed become commonplace. I just saw an article on the Gizmag website that talks about the imminent home invasion of 3-D printing. You can get a fully functional, fully assembled 3-D printer for, like, $1,500. As these devices have incrementally come down in price, they have moved from the laboratory to the marketplace, from professional engineering and architectural shops to the serious hobbyist. Now, Gizmag says, they're going to start showing up at the consumer level. The Gizmag piece focused on a 3-D printable set of headphones someone has developed; it's made up of several pieces that snap together. They actually work, and apparently work pretty well. On the other hand, the headphones are called the 13:30 — that's 13 hours and 30 minutes — because that's how long it takes to fabricate them. Not exactly instant gratification. But it's a start. As the technology trickles down, we'll see more and more clever designs for products, the devices will get faster, and before you know it, we'll be buying them from Wal-Mart and downloading gadgets from Amazon.

There is one thing, though: You think the cartridges for those inkjet printers are expensive? You ain't seen nothin' yet.

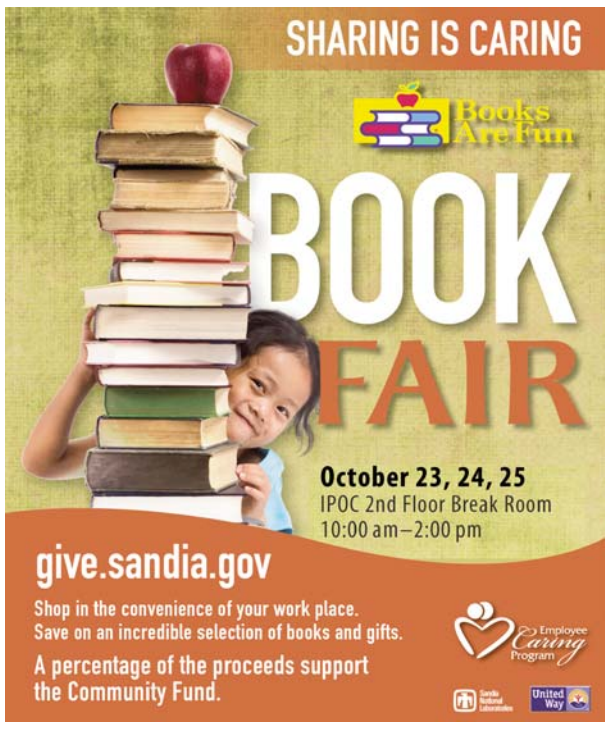
* * *

A couple of weeks back, a Feedback correspondent submitted a complaint about what he perceived to be a change in quality of the toilet paper used in Sandia restrooms. And he didn't mean a change for the better. Quite the contrary. In fact, the writer, straying perilously close to the "too much information" threshold, said his "field experiments" with the new product were extremely unsatisfactory. Was Sandia, the writer wondered, trying to save money? I wondered, too, my personal field research having verified the writer's own results. (We're talking science here folks, repeatability being one of the foundations of the scientific method.) In the Feedback process, the idea is to pass along the anonymously submitted question to the appropriate subject matter expert for an authoritative response. That's where I got stumped; I turned to my colleague Randy Montoya, whose wisdom rivals that of Carnac the Magnificent. Randy, I said, somewhat bewildered, "Do I send this Feedback to Facilities? Or to Benefits?"

In case you're wondering, having perhaps performed your own field experiments, Custodial Services answered the Feedback question by noting that Sandia has not switched to a lower-grade toilet paper. "We are working closely with the manufacturer and the distributor to determine what has changed and when we can expect to have the issue resolved," they say.

See you next time.

— Bill Murphy (505-845-0845, MS 0165, wtmurph@sandia.gov)



Upcoming events give tech startups and entrepreneurs info on venture-capital summit

Technology Ventures Corp. is accepting business plans and executive summaries from US technology companies interested in presenting at the 2013 Deal Stream Summit in Albuquerque. Two information sessions are coming up, one at Sandia and one in the Sandia Science & Technology Park.

For 20 years the summit has connected growing and expanding tech companies with investment opportunities. Historically, one in three of the presenting companies have been funded.

Preference will be given to plans and companies using technologies developed by or with a DOE laboratory.

The submission deadline is Jan. 4, 2013. Interested parties should contact TVC for help with business plan development.

The information sessions will be held Oct. 31, 11:30 a.m.-1 p.m., in Sandia's Bldg. 823 Breezeway and Oct. 30, 11:30 a.m.-1 p.m., at Applied Technology Associates, 1300 Britt St. SE, in the SS&TP. Attendees can meet the TVC team and learn how the Deal Stream process works.

"The upcoming Call for Plans events give startups and entrepreneurs, or even those thinking of starting a high-tech business, an introduction to the resources available to you or your company," says John Freisinger, TVC president and CEO. "TVC can help you create, start, or grow your new venture and we do it all for free."

RSVP to Michelle Mang-Gonzalez at michelle.j.mang@lmco.com or 505-843-4110.

Sandia LabNews
Sandia National Laboratories

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Retirement without brakes

By Patti Koning

Surround yourself with friends and family, drink lots of water, and have a thick skin — these are all lessons that Sandia retiree Dan Chang learned from the tall trees in Muir Woods National Monument. Once a week you can find him giving the "Tree Talk" among the redwoods, not the most likely place to find an electrical engineer.

Volunteering as a docent at Muir Woods is just one of the many activities Dan has taken on since retiring from Sandia in 2000. There is a common theme running through both his career and retirement — Dan is always looking to learn and experience something new. For him, retirement means working just as hard as he did with a full-time job.

"I became an electrical engineer because there is always something new emerging in this field," he says. "In my generation we've gone from integrated circuits to mainframes to personal computers. I find all the change exciting."

A native of Taiwan, Dan studied electrical engineering at college in his home country and earned his PhD from UC San Diego. He first worked for Dikewood Corp. in Albuquerque before joining Sandia in 1978. In fact, it was Dan's curiosity that brought him to Sandia.

"My wife and I went on a tour of Sandia's solar energy facility because I was curious about the program," he says. "On the tour I learned that Sandia was looking for electrical engineers with EMP experience, which fit me perfectly."

Dan developed an underground radar technology for Sandia's energy program, which was later used to augment Los Alamos National Lab's hydrodynamic yield measurement technique, CORRTEX. These technologies became important to the Comprehensive Test Ban Treaty between the United States and the Soviet Union, specifically the on-site monitoring component. In 1988, Dan was commended for a briefing he presented on his technique to a visiting Soviet delegation.

He spent 15 years in Albuquerque before joining the electrical systems group at the California site. The move, naturally, was driven by his desire to learn and experience new things.

DAN CHANG

After retiring from Sandia, the last thing Dan wanted to do was take it easy. He ensured that this wouldn't be the case by becoming a Civil Service commissioner for Alameda County. The Civil Service Commission regulates the employment and working conditions of civil servants. The Alameda County Civil Service commissioners are appointed by the Alameda County Board of Supervisors.

"Initially, I thought this was going to be something easy. But a majority of the commission must approve every decision, so I had to learn to be convincing while listening to the other commissioners' points of view and sometimes compromising to come to an agreement," says Dan. "I learned to be a good listener and to speak precisely."

In his retirement Dan also became involved in the Asia Pacific Economic Cooperation (APEC) organization, a 21-country economic forum with the goal of supporting sustainable economic growth and prosperity in the Asia-Pacific region. Dan chaired the Telecommunications and Information Technologies Development Steering Group, a role that took him to Taiwan for five years.

During this period, he travelled to 18 countries to attend meetings and enhance his technical knowledge.

"APEC can only pass resolutions by unanimous vote," he says. "So I learned more about listening, compromise, and negotiating."

After his term as chair of the Telecommunications and Information Technologies Development Steering Group ended in 2000, Dan returned to his home in Fremont and immediately began looking for new ways to keep busy and continue learning. One day he drove his wife to Muir Woods, where she was interested in volunteering. Once there, Dan decided to join his wife in this endeavor.

"I think the redwoods have a lot to teach us about how to live a long life — have a thick skin, for example," he says. "I enjoy sharing my knowledge of the redwoods with the many visitors to Muir Woods from all over the world. It brings home the point that we are living in a global village and we are all neighbors. We should learn to slow down to enjoy the fresh air and tall trees surrounding us."

Because of the distance, Dan and his wife only volunteer one day a week in Muir Woods. After decades of a workaholic life, he says, he needed something to fill the rest of the week. He began volunteering as an information officer at the Superior Court of California in Alameda County.

"I provide information to the court's visitors on where to go and what to do," Dan explains. "During my first year there, I found that these folks look very much like you or me. They are friendly and courteous, even our tattooed brothers and sisters. They may have broken the laws simply because they are not familiar with them."

Retirement has taken Dan places he never expected to go and thrust him into new roles. His next adventure may be a mystery now, but it's a safe bet that he won't be at home taking it easy.

Sandia CaliforniaNews

Sandia/California claims NNSA Pollution Prevention awards

At the Sandia/California Farmer's Market last month, Karin King (in photo at right), environmental engineer in the Laboratory Site Office (LSO), presented four National Nuclear Security Administration (NNSA) Pollution Prevention (P2) awards to Sandia and Lawrence Livermore National Laboratory. The recipients were the Fresh@ the Labs project (in photo at bottom right); the hydrogen shuttle bus (in photo below), administered by the Office of Energy Efficiency and Renewable Energy's Fuel Cell Technologies Program; Innovative Green Cleaning at the National Ignition Facility; and the High Performance Computing Innovation Center.

Photos by Randy Wong

BOB GLASS (LLNL), on left, Lenny Klebanoff (8367), center, two members of the hydrogen shuttle bus project team, with Phil Hill, NNSA technical deputy for Safety, Security, and Operations. This program was administered by the Office of Energy Efficiency and Renewable Energy's Fuel Cell Technologies Program, and supported the early market adoption of these technologies.

SANDIA AND LAWRENCE LIVERMORE NATIONAL LABORATORY COLLABORATED on Fresh@ the Labs that brings locally sourced fruits, vegetables, nuts, grains, and more to both sites at a monthly farmer's market. The pilot effort saw more than 2,000 attendees with 20 local vendors.

FLC awards

(Continued from page 1)

Jackie Kerby Moore, manager of Technology and Economic Development Dept. 1933 and Sandia's representative to the FLC. "They recognized the entire spectrum of our work, from technology development to technology transfer, as well as the economic impact that technology transfer creates."

FLC AWARD WINNER Bianca Thayer (1931), left, of Intellectual Property Management, Alliances and Licensing, and Jackie Kerby Moore, manager of Technology and Economic Development Dept. 1933, flank Karina Edmonds, technology transfer coordinator for the US Department of Energy, at the recent Federal Laboratory Consortium Far West/Mid-Continent awards celebration in San Antonio, Texas. Bianca was part of the Sandia team recognized for its work in commercializing the Labs' crystalline silico-titanates technology.

CST ion exchangers

The Excellence in Technology Transfer award went to people involved in development and commercialization of CSTs — business development specialist Bianca Thayer (1931), Geochemistry Dept. 6915 Manager Mark Rigali, and researcher Tina Nenoff (1114).

CSTs are inorganic, molecularly engineered ion exchangers that can remove high-level radioactive contaminants such as cesium from wastewater. UOP, a Honeywell company, licensed the Sandia technology in the mid-1990s and revised the license last year to become the exclusive US manufacturer of CSTs.

CSTs played a role when the Fukushima Daiichi nuclear power plant outside Tokyo was damaged in an earthquake and tsunami on March 11, 2011. Seawater was pumped in to cool the reactors. The water was contaminated with cesium and could not be released back into the ocean.

Tina, who had experience developing and working with CSTs in the 1990s, was called upon to test the material for removal of cesium in seawater. She worked around the clock for 10 days, concluding that CSTs outperformed other materials in removing cesium from seawater.

Honeywell UOP products with CST technology have successfully treated more than 40 million gallons of contaminated water at Fukushima.

Biomimetic membranes

The Notable Technology Development award recognized researcher Susan Rempe (8635) and her team's work with biomimetic membranes, a revolutionary advance in the field of membrane technology for water filtration.

Nearly half the world's population has inadequate access to clean, fresh water. Desalination plants pass salt water through membranes that remove salts and create drinkable water. But membrane technology has advanced slowly the past 30 years.

The biomimetic membrane, inspired by how the human body filters water, uses self-assembly and atomic layer deposition. It is designed for water purification using reverse osmosis technology, which removes impurities with applied pressure powered by electrical energy.

The Sandia technology received an R&D 100 Award in 2011. "We made a synthetic membrane that mimics the nanoscale design features of natural water purification channels," Susan says. "By doing so, our initial membranes achieved a 10-fold improvement in water purification efficiency compared with state-of-the-art RO membranes."

Biomimetic membranes can increase access to clean water by dramatically reducing energy use and costs.

i-GATE

The Outstanding Partnership Award recognized the i-GATE regional public-private partnership in California designed to support small businesses and maximize the economic potential of green transportation and clean-energy technologies. i-GATE (Innovation for Green Advanced Transportation Excellence) creates a link between national laboratories and entrepreneurs, industry, venture capital, universities, and economic development resources to accelerate the commercialization of energy technologies and grow a cohesive innovation ecosystem.

The i-Gate National Energy Systems Technology (NEST) incubator opened in June 2011 to help small companies work with advanced transportation or renewable energy technologies that can leverage technical assistance from Sandia/California or Lawrence Livermore National Laboratory. The i-GATE NEST has helped create 62 direct and 118 indirect jobs.

The award recognized Bruce Balfour (8539), a Sandia technical business development specialist and i-GATE president; Rob White, city of Livermore Economic Development director and i-GATE CEO; Louis Stewart, deputy director of Innovation and Entrepreneurship, California Governor's Office of Business and Economic Development; and Buck Koonce, director of Economic Development at Lawrence Livermore National Laboratory.

DAKOTA software

The fourth FLC award was an honorable mention for Notable Technology Development that went to DAKOTA software and the project lead, computer scientist Brian Adams (1441). Engineers often need computational simulations to solve scientific problems. Sandia's Design Analysis Kit for Optimization and Terascale Applications (DAKOTA) is an open-source software tool that helps researchers adjust and assess the accuracy of such models.

DAKOTA helps researchers know if their simulations are accurate and how they can be optimized to produce the most realistic, reliable predictions. The software answers such questions as how reliable or variable a system is and what models or parameters best match experimental data.

DAKOTA shortens design cycles and cuts development costs. It is used extensively at national laboratories to solve a wide range of energy and national security-related problems, and to conduct research with academic, government, and industrial partners.

"This year we were honored for our technology transfer successes across the globe as well as closer to home," Jackie says. "Whether our impact was in Japan or our own Livermore community, our technologies and our people are making a difference."

The FLC is a nationwide network of more than 300 members that provides the forum to develop strategies and opportunities for linking laboratory mission technologies and expertise with the marketplace.

The FLC Awards Program annually recognizes federal laboratories and their industry partners for outstanding technology transfer efforts. Since its establishment in 1984 the FLC has presented awards to nearly 200 federal laboratories, becoming one of the most prestigious honors in technology transfer.

Ron Lipinski wins Secretary of Energy Achievement Award for role on Mars team

By Stephanie Holinka

Ron Lipinski (6223) received a Secretary of Energy Achievement Award for his role as team lead in the Mars Science Laboratory Multi-Mission Radioisotope Thermal Generator team (MSL MMRTG team).

DOE chose Sandia in 2006 to conduct the safety analysis for all nuclear missions. Ron is the team leader for Sandia's safety analysis report.

Between late June and late November of 2011, the Mars Science Laboratory Multi-Mission Radioisotope Thermoelectric Generator team delivered the Multi-Mission Radioisotope Thermoelectric Generator for NASA's Mars Science Laboratory mission, which launched Nov. 26, 2011.

"We look at the probabilities of all the different accidents that could happen. . . . We run the code more than a million times, so we build up a large statistical database."

— Ron Lipinski

The award is presented to a team of DOE employees (federal and contractor) who together accomplished significant achievements on behalf of the department. Individuals and teams are selected by the secretary of energy for the awards.

Ron received his award Thursday, Oct. 4, via video teleconference and satellite broadcast of DOE's 35th anniversary celebration and Secretarial Honor Awards Ceremony.

NASA's $2.5 billion MSL Curiosity rover, the largest and most sophisticated vehicle to visit the Red Planet, is powered by a Multi-Mission Radioisotope Thermoelectric Generator, or MMRTG. The generator turns heat from the decay of 10.6 pounds of plutonium dioxide into 110 watts of electricity to move the rover and run a suite of 10 instruments, which can do things like find water 32 feet below the surface and analyze chemical composition of rocks three car-lengths away.

While the MMRTG significantly increases the rover's range and lifetime from previous rovers, which relied on solar panels, launching nuclear material — such as the marshmallow-sized plutonium pellets in the generator — requires diligent attention to safety.

Sandia provides probabilities of risk to the decision makers, who decide whether to launch.

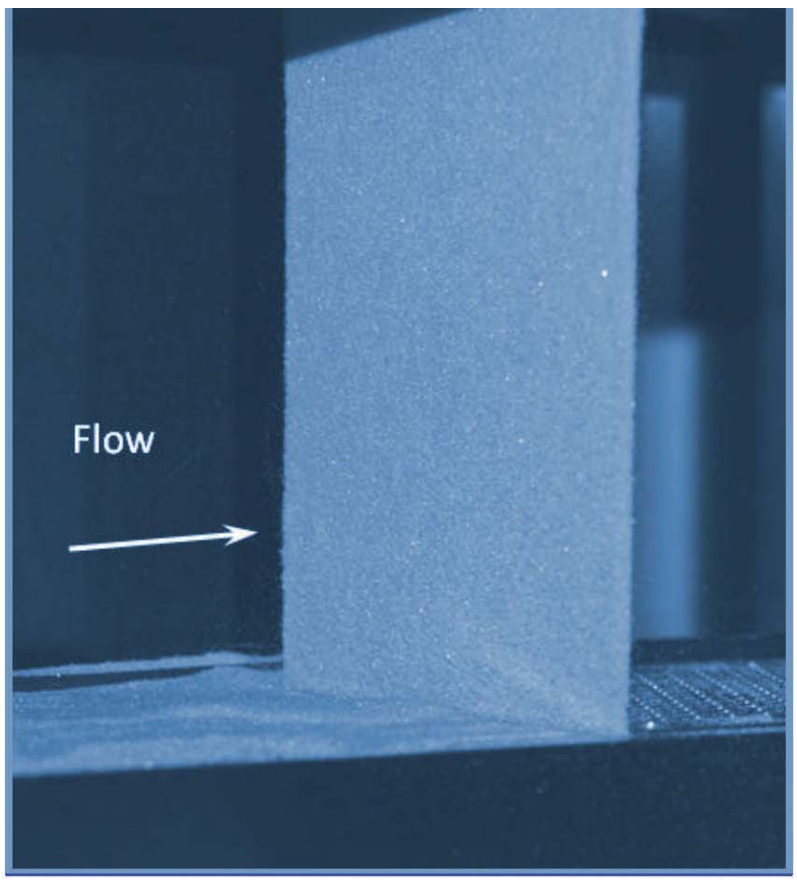
"We look at the probabilities of all the different accidents that could happen. Because each event can happen at a particular time and a different way, we simulate the trajectory of a launch," Ron said as the Mars Science Laboratory began its eight-month journey. "There are parameters that represent those times and ways, and we randomly select each of these every time we run the code. We run the code more than a million times, so we build up a large statistical database."

The team also implemented a documented safety analysis for three temporary nuclear facilities at Kennedy Space Center; implemented a rigorous unreviewed safety question process for DOE, Kennedy Space Center and Jet Propulsion Laboratory procedures; and participated in radiological contingency planning and implementation for launch.

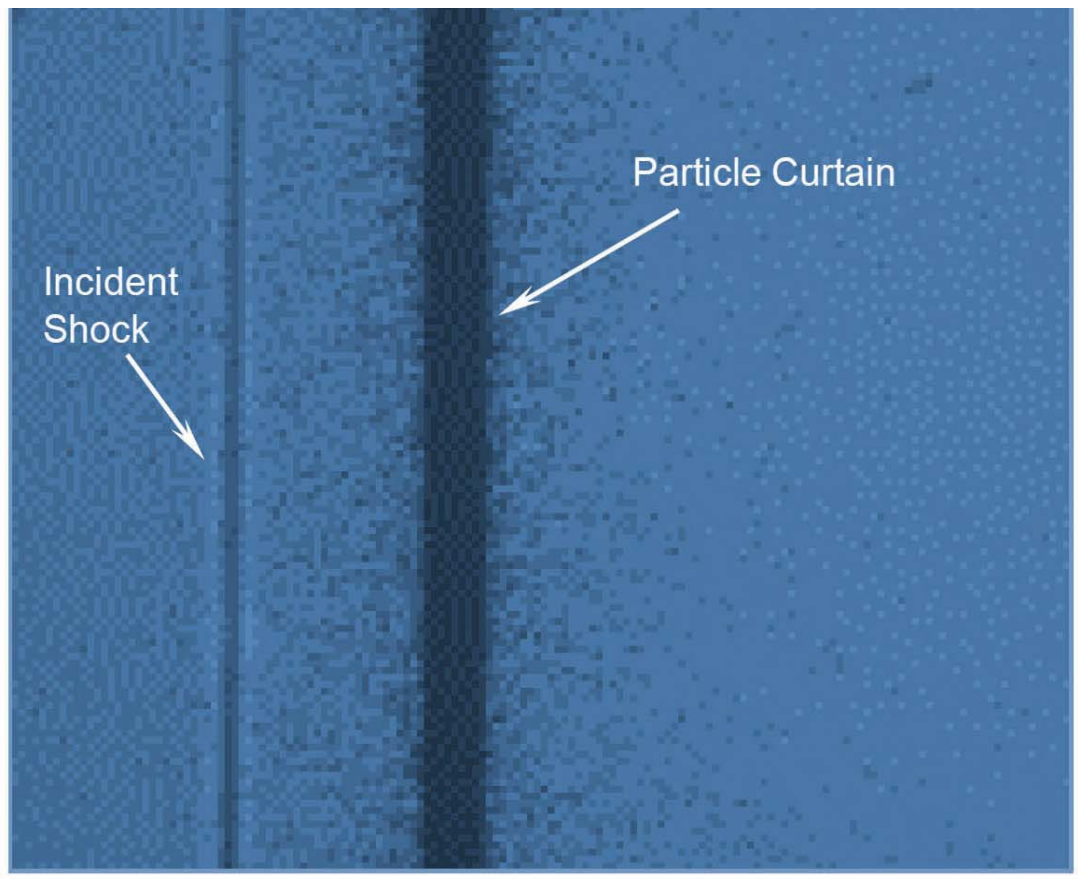
"The whole team that worked on this did a spectacular job pulling together everything needed for the phenomena and modeling," Ron says.

Multiphase shock tube

offers insights into physics early in blasts



PARTICLE CURTAIN — This photo, indicating the direction of the shock wave, shows the dense curtain of particles used to study shock-particle interactions in Sandia's one-of-a-kind multiphase shock tube. (Photo by shock tube team member Brian Pruett)



SHOCK WAVE —Sandia's multiphase shock tube is unique because of its ability to study how densely clustered particles disperse during an explosion. This photo, taken in the shock tube, shows a shock wave microseconds before it arrives at the particle curtain. (Photo by shock tube team member Justin Wagner)

Sandia's one-of-a-kind multiphase shock tube began with a hallway conversation about five years ago that culminated in the creation of what engineer Justin Wagner describes as the only shock tube in the world that can look at shock wave interactions with dense particle fields.

Story by Sue Major Holmes

Shock tubes have been around for decades. What makes Sandia's unique is its ability to study how densely clustered particles disperse during an explosion. That's important because understanding the physics that occurs at the first tens of microseconds of a blast can help improve computer codes that model what happens in explosions.

"Not having this correct in those codes could have implications for predicting different explosives properties," says Justin (1515).

"When we hired Justin we had an empty room and a blank sheet of paper. Now we have a shock tube that is different from what anybody else in the world has."

—Steve Beresh

In that years-ago conversation, Steve Beresh (1515) and Sean Kearney (1512) asked a since-retired colleague, Melvin Baer, what he'd like to measure that he hadn't been able to. "He started talking about some of the missing physics that were in the models that are used for predicting explosives, and Sean and I looked at each other and said, 'We think we could do that,'" Steve recalls.

They came up with the idea of a multiphase shock tube that would enable researchers to study particle dispersal in dense gas-solid flows. The project was initially funded under the Laboratory Directed Research and Development program.

"We needed somebody to actually make it work so we hired Justin as a postdoc" to oversee the design and building phase, says Steve. Justin has since joined Sandia's regular staff.

"When we hired Justin we had an empty room and a blank sheet of paper. Now we have a shock tube that is different from what anybody else in the world has," Steve says.

First fired in 2010

The machine, first fired in April 2010, is considered multiphase because it can study shock wave propagation through a mixture of gas and solid particles.

Particulates in an explosion start out tightly packed. As the explosive process continues, they disperse more and more and quickly become widely spaced. But the physics of the densely packed particles at the start of the explosion are crucial to everything that comes later. Currently, they are not thoroughly understood, and therefore existing models are equally limited, Steve and Justin say.

The team says better understanding the particle dynamics in the early part of a blast will help Sandia respond to national security challenges surrounding detonations, including improving explosives, mitigating blasts, or assessing the vulnerability of personnel, weapons, and structures.

A shock tube generates a shock wave without an explosion. "The important thing about the shock tube is it generates a planar shock wave," Justin says. "We study the interaction of the shock wave with a dense field of particles to understand the physics relevant to explosives processes."

The multiphase shock tube uses such diagnostics as high-speed pressure measurements, high-speed imaging, and flash X-ray to measure gas and particle properties, and it's adding laser-based diagnostics, Steve, Sean, and Justin say.

A better view of the physics

"We can get different things from the X-ray diagnostics, different things from the laser-based diagnostics, different things from temperature and pressure measurements, and by piecing all of that together we get a better view of the physics that are occurring in the shot," Steve adds.

The machine's unique diagnostic capabilities demonstrate Sandia's ability to collaborate. The team particularly singles out the X-ray expertise offered by Enrico Quintana and Jerry Stoker's group in Org. 1522.

"Once you get the thing built, then the diagnostics required to get useful information out of it are also difficult and expensive," Justin says. "There's a reason why it hasn't been done thoroughly in the past."

A lot of data for modeling come from explosions, but it's difficult to isolate what happens in each part of a blast, Sean says.

"Whereas if you do an experiment like this you can delve deeper into what is really happening," he says. "But it's just one piece of the puzzle and they're all important."

The stainless steel and aluminum shock tube, about 22 feet long, is divided into a high-pressure or driver section that creates the shock wave, and a low-pressure or driven section, with a diaphragm or burst disk between the two. Pressure builds up in the cylindrical driver section and when it gets high enough, the diaphragm ruptures. Spherical particles loaded into a hopper above the low-pressure section flow into the shock tube before the diaphragm breaks, creating a dense particle curtain that's hit by the shock wave.

Justin, Steve, Sean, and Brian Pruett (1515), along with Wayne Trott, Jaime Castaneda, and Melvin Baer, all now retired, made a presentation on the work in April 2011 to the Engineering Sciences External Review Board. The team says Elton Wright (6916) also made a sizeable contribution to the project.

Experiments and diagnostics are complicated, so team members are still gathering data to eventually incorporate into codes used at Sandia and elsewhere.

"It's clear that we've learned some things that weren't known before," Steve says. "Those physics [inputs] are important to a code."

". . . [I] f you do an experiment like this you can delve deeper into what is really happening. But it's just one piece of the puzzle and they're all important."

— Sean Kearney

'Add a dime to the dollar'

ECP campaign kicks into high gear with history-making goal

By Nancy Salem

The Employee Caring Program (ECP) got off to a strong start, headed toward becoming New Mexico's most generous United Way campaign ever.

"The campaign kicked off very well," says Anthony Thornton, this year's ECP campaign chair and deputy to the VP of Defense Systems and Assessments Dept. 5220. "Across the Labs we're seeing a true interest in getting involved. People want to help the community."

ECP launched Oct. 8 with an event at the Steve Schiff Auditorium that brought Sandians together with representatives of local nonprofit agencies supported by the United Way of Central New Mexico (UWCNM). A donation was made to the UWCNM Community Fund, which supports the area's most vulnerable people, for every Sandian who attended and visited the booths.

Hundreds turned out and the donation totaled $5,148. "We had more than 30 agencies and about 300 people," Anthony says. "Everyone was very appreciative."

Colleen Heaps, office manager for Junior Achievement of New Mexico, says she was impressed with the launch and with Sandia's community spirit. "So many people stopped by to talk to us and find out about our program," Heaps says. "Our volunteers work in the schools to build financial literacy and empower kids, and the Sandians really showed an interest. They were very engaged."

The ECP campaign runs through Oct. 26. Sandia's goal is to become the first New Mexico company to raise $5 million in a single year for the UWCNM. The 2012 campaign also aims to increase participation in every division from the 2011 baseline and engage newer employees in the Labs' culture of giving.

Since the ECP was launched in 1957, Sandia has been the single largest supporter of the United Way's annual campaign. Sandians contributed more than $4.6 million of the $27 million collected last year.

Anthony says that if everyone adds 10 cents to each dollar they pledged last year, the $5 million goal will be achieved. "It's within reach," he says. "Please give. Add a dime to the dollar."

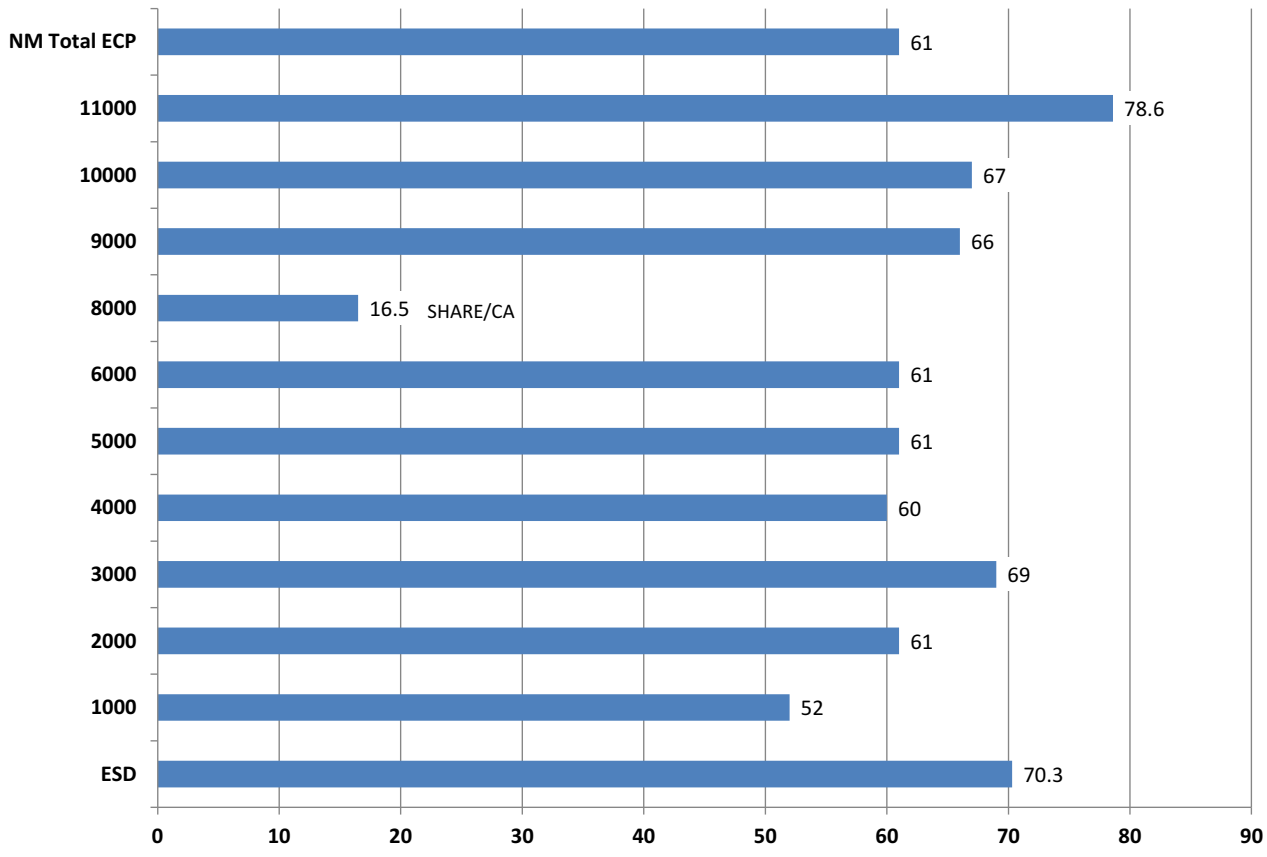
Deputy Laboratory Director and Executive VP for Mission Support Kim Sawyer is chairing central New Mexico's 2012-13 $28.15 million campaign. "United Way helps ensure those in need receive necessary services, including food for the elderly, programs to keep our children in school, a place to live for the homeless, or programs to prevent family violence," Kim says. "At Sandia, we have the opportunity and privilege to give back to our community."

Anthony says he is very optimistic as ECP moves along. "Enthusiasm is picking up," he says. "People see the state of the economy and know the needs are greater. I think we at Sandia feel a responsibility to help the community when it needs it most."

CALL FOR COMMITMENT — Anthony Thornton, Sandia's 2012 Employee Caring Program campaign chair, speaks at a Div. 5000 ECP kickoff event. Looking on is Div. 5000 VP Jeff Isaacson. Anthony is encouraging every Sandian to add 10 cents to every dollar they pledged last year to boost the Labs' total ECP contribution to the $5 million mark and beyond.

ECP contributions by Division

(as of Oct. 15, 2012; campaign ends Oct. 26)



ECP/United Way Campaign

October 8 - October 26

The ECP/United Way campaign runs from October 8-26 this year. Anthony Thornton, Sandia's 2012 ECP Campaign Chair, encourages all to check out the website at https://www.trygiving.com/ and take advantage of the opportunity to sign up for a payroll deduction that will go to support either our local community fund or any nonprofit organization that we care about.

"Why have you been a loyal contributor to the Employee Caring Program?"

"It's really very simple. I've always lived a blessed life — great parents, great educational opportunities, a challenging and rewarding career, wonderful friends, good health, and satisfying hobbies. Not everyone is so lucky. ECP has been a very simple, straightforward way to help those who haven't been as fortunate."

— Leann Miller (5636)

"I rely on the Employee Caring Program to identify important community organizations for support. There are diverse issues in the community of varying degrees of importance, and methods to address each of varying degrees of merit. The ECP helps me contribute to the community by sorting through the issues and approaches more broadly and thoroughly than I can alone."

— David Outka (5416)

"I have been a contributor to the Employee Caring Program for over 25 years because the program has made the 'right thing to do' the 'easy thing to do.' The 'right thing to do' is to help my community. My contributions have been strengthening the community by providing support for a wide spectrum of needs that help infants to seniors. And 100 percent of my contributions go directly to the agencies I designate because Lockheed Martin, as a Corporate Cornerstone program participant, helps pay for United Way administrative costs. Through easy ECP signup and payroll deductions, Sandia has made being a contributor the 'easy thing to do.' As Gandhi said, 'You have to do the right thing … You may never know what results come from your action. But if you do nothing, there will be no result.' Join me in contributing to ECP – the 'right thing to do.'"

— Ann Hodges (5212)

"I was fortunate to grow up with parents who, from as early as I can remember, were involved in volunteer and community work. The selfless example they set by living out the principle we all have, not only a capacity, but a responsibility to impact those around us in a positive way left a lasting impression on me. To this day, that simple value of leaving the world a little better than we came into it fuels my desire to give."

— Darrick Hurst (3601)

AARON BRUNDAGE (5431) came full circle with Big Brothers Big Sisters. He was helped by a Big Brother as a child and now serves as a Big Brother to boys who need a positive male role model. (Photo by Randy Montoya)

Sandia engineer with humble beginnings finds joy in helping others succeed

By Stephanie Hobby

Growing up in Pittsburgh as the only child of a single mother, Aaron Brundage (5431) didn't have a whole lot. He and his mom lived on her meager secretary's salary in a small townhouse, but they never talked about what they didn't have. Instead, she gave him everything she could and kept him on track in school. But Aaron's mom knew he needed a positive male role model, and when he was 7, he was matched with his Big Brother, Pete, through Big Brothers Big Sisters.

Aaron remembers going to the park with Pete, playing Frisbee, riding bikes, and finding joy in ordinary childhood activities. Although the experiences were simple, Aaron knew at the time that his Big Brother was invested in his growth and success, and that was important.

Today, Aaron is a successful engineer at Sandia, where he conducts modeling and simulation of energetic materials, penetration mechanics, thermodynamics, and combustion and shock physics. His first experience with Sandia was as an intern in 2002, while he was pursuing his PhD in mechanical engineering at Purdue University.

His interest in engineering started when he was very young. When he was 3, his mom gave him a LEGO 566 kit for Christmas, and he immediately started work on it and didn't move until the project was complete. When he was a little older, every Saturday Aaron would be outside building things out of Quaker Oats canisters, toilet paper rolls, and whatever materials were available. That love of learning continued throughout his childhood and eventually led to him graduating with honors from Pennsylvania State University, where he also earned his master's degree, both degrees in mechanical engineering.

Despite his tremendous professional accomplishments, Aaron says he will never forget the importance of having someone encourage him to pursue big dreams. And now he's giving back in a big way.

Not only does Aaron have his own "Little," but he also serves on the board of directors for Big Brothers Big Sisters of Central New Mexico, and has dedicated his time to encourage young people to take up a love of learning. He and his wife, Christy, founded ABQ's Playroom, an indoor play space whose mission is to preserve and promote playtime for all children. Free play time, custom birthday parties, Kindermusik early childhood music classes, and children's technology classes are offered. There, he teaches children as young as 4 about robotics in an eight-week class using programmable LEGO sets.

He and his wife also founded a non-profit organization, Tools for Learning Outreach Services (TFLOS), in 2011. TFLOS provides free and low-cost educational, social, and recreational outreach services to individuals, families, community-based programs, and organizations that serve children from disadvantaged backgrounds with program areas in STEM education, free and unstructured play, and early intervention. Aaron serves as a board member and volunteers as the educational director of TFLOS.

Aaron has also spent eight summers as a STEM instructor for HMTech, Sandia's summer science program for underrepresented youth. For the past five years, Aaron has provided ACT training for underrepresented youth as part of a program at the University of New Mexico. In addition, he used his position as chair and past director of the New Mexico section of the American Society of Mechanical Engineers (ASME) to increase the representation of early career engineers under the age of 35 by providing statewide training in an Early Career Forum and coordinating advertising and fundraising through the ASME national office.

All of this outstanding community service and professional achievement led Aaron to be named one of Albuquerque's "40 under Forty" by the *New Mexico Business Weekly* earlier this year.

As someone who is so involved in the community, Aaron has daily encounters with the needs of people around us. He says he hopes people will donate through Sandia's ECP campaign because United Way donations have a wide-reaching and important impact on the less fortunate.

"I see so many people who have a variety of needs, and from what I see, there is a lot that the United Way can provide. My wife and I are Alexis de Tocqueville Society members who contribute to both the Community Fund and specific charitable organizations. We believe that to whom much is given, much is required. Donating to United Way is an outstanding way to give back to the community," Aaron says. "As a donor and a board member, I am proud of this partnership with Sandia, and would really encourage everyone to think about participating in this year's ECP campaign."

The following list gives examples of the many ways your gift to the Community Fund supports more than 90 programs to keep children in school, protect families from violence, help parents return to self-sufficiency and raise the next generation of New Mexicans to be strong, intelligent, and community-minded. **Thank you!**

$2.00 per pay period provides:
Screenings for breast cancer, heart disease and osteoporosis for one woman with no health insurance.
A backpack filled with weekend meals for 18 underprivileged children.
At 23¢ per meal, almost 209 meals for hungry men, women, children, and seniors.

$3.00 per pay period provides:
One year of support and education for a stroke survivor and their family caregivers.
One year of job mentoring and training to increase self-sufficiency for a woman transitioning from welfare to the work force.

$4.00 per pay period provides:
One year of educational and career programs for at-risk youth.
One week of childcare for a child from a low-income family.

$5.00 per pay period provides:
One year of transportation for individuals who need medical care.
One year of day shelter services for someone left homeless.

$10.00 per pay period provides:
Free legal services to underprivileged individuals throughout New Mexico.
Group support to family caregivers to assist them in their caregiver roles.

$15.00 per pay period provides:
One year of treatment for 13 children who have been victims of abuse.
One year of medical, dental, and counseling services for homeless children and their family members.

$20.00 per pay period provides:
One month of transitional housing and support services for a homeless family.
One year of one-on-one literacy tutoring for a child at risk of school failure.

$25.00 per pay period provides:
Shelter, counseling, job training and assistance with transitional housing for a family starting a new life free from family violence and abuse.
One year of transportation to and from work for an individual with disabilities.
Support and counseling at a Family Cancer Retreat for three families facing cancer.

$35.00 per pay period provides:
Safe after school child care for a child for one year.
One year of day shelter services for a homeless family of seven.

$50.00 per pay period provides:
One year of one-on-one tutoring for two at-risk children.
One year of job mentoring and training to increase self-sufficiency for 16 women transitioning from welfare to the work force.

*** Based *roughly* on 24 pay periods**

WRITTEN ON THE WIND

A JUST-RELEASED STUDY By Sandia researchers promises to help the nation's wind power plants, like this 160-turbine facility near Fluvanna, Texas, benchmark their performance, understand vulnerabilities, and enhance productivity. The above photo was shot by Gary Froehlich (5345) during the May 2012 annular solar eclipse. Gary spent several months planning the shot, studying the options and calculating the optimal location and foreground visuals before determining that the Brazos Wind farm in Fluvanna filled the bill. He writes that the clouds parted that day just in time for him to capture this striking photograph.

Sandia benchmark helps wind industry measure success

By Stephanie Hobby • Photo by Gary Froehlich

A just-released Sandia study on wind plant reliability should help the nation's growing wind industry benchmark its performance, understand vulnerabilities, and enhance productivity.

Until now, wind farm owners and operators had no way to compare their output with the output of similar operations. To benchmark the reliability of the US wind turbine fleet and identify major causes of failures and downtime, DOE commissioned Sandia in 2010 to build the Continuous Reliability Enhancement for Wind, or CREW, database. This is the first effort to compile a comprehensive, operator-independent dataset that accurately reflects the performance of the US wind fleet.

Every year, Sandia surveys the database and publishes the results to help benchmark the industry. The more than 800 wind turbines studied for the 2012 Wind Plant Reliability Benchmark are either producing electricity or are available to produce electricity 97 percent of the time, up from 94.8 percent in 2011.

"With better understanding of how major turbine systems are performing, wind operators can focus on improving those areas that will drive increased reliability and efficiency," says CREW team lead Alistair Ogilvie (6121).

In 2008, a DOE collaborative published "20% Wind Energy by 2030." The report suggests that by 2030, wind could supply 20 percent of the nation's electricity, compared to less than 1 percent in 2007 and 3 percent in 2011. The report also discussed industry-wide risks related to lower-than-expected reliability and growing costs of operations and maintenance.

Objectively characterizing the fleet

"Our assignment from DOE is to objectively characterize the national fleet," says Valerie Peters (6121), CREW lead reliability analyst. "We're looking across technologies, locations and companies to create benchmarking statistics for the entire US wind turbine fleet."

Major turbine systems include a set of three blades, rotor, shaft, generator, and gearbox, and all of those components might break or otherwise need maintenance. Sandia's team is working to determine which components are the most vulnerable and help industry address those concerns to prevent downtime. The costs associated with a turbine going offline add up quickly. The owner not only loses productivity, but the cost of hiring a crane for repairs can be upward of $250,000. Since only a few cranes in the nation are large enough to handle turbine heights and component weights, it may be months before the turbine is up and running again.

Four wind plant owner/operators are participating in the development phase of the CREW project: EDF Renewable Energy (formerly enXco Service Corp.), ShellWind Energy, Wind Capital Group, and Xcel Energy. Sandia researchers are able to collect high-resolution data from key operating parameters such as wind speed, ambient temperatures, blade angles, component temperatures, and torques. Every few seconds, a wind turbine's SCADA system captures a complete picture of how the turbine and its components are performing, compared to a defined operating environment.

"It's an important project that will help encourage increased use of a low-carbon power source, and it could not have succeeded without the outstanding support and leadership of the wind industry and DOE."

— CREW team lead Alistair Ogilvie

CREW database contains data for more than 800 turbines

Sandia's CREW database contains data for more than 800 turbines, which have generated two terabytes of raw data, about 20 percent as large as the entire print collection of the US Library of Congress. Sandia's Enterprise Database Administration Team is processing this enormous dataset into a usable database that can readily support a wide range of rapid queries.

The gathered data is used for various analyses, including public benchmark reporting and DOE reports. DOE uses its reports to guide research and development investments by identifying critical issues and strategies to improve wind technologies.

The annual public benchmark report characterizes the operations and maintenance experience of the US fleet, using aggregated reliability and performance metrics that let owner/operators compare their plant against the CREW fleet.

"We're excited about the results so far and look forward to the next few years as we make an important contribution to the industry to improve reliability through a component-level focus," Alistair says. "It's an important project that will help encourage increased use of a low-carbon power source, and it could not have succeeded without the outstanding support and leadership of the wind industry and DOE. Together we can share our expertise to help shape the future of the nation's wind energy generation."

The CREW Database Wind Turbine Reliability Benchmark and other Sandia wind energy publications are available on Sandia's website at http://energy.sandia.gov/crewbenchmark.

Methanol, natural gas cited as serious short-term answers to nation's energy challenges

Former CIA director James Woolsey shares thoughts at National Security Speaker Series and Climate Security Program

By Neal Singer

James Woolsey, retired director of the Central Intelligence Agency and advisor to four US presidents, told a Sandia audience that the most effective solution to rising gasoline prices would be to power cars with methanol.

He also suggested powering large electrical generating stations with natural gas while developing smaller, distributed stations powered eventually by photovoltaics.

JAMES WOOLSEY

Because of fracking, he said, methanol — though only half as energetic as gasoline — is available at one-fourth gasoline's price. Its cost per mile is therefore half that of gasoline. Converting automobiles from gasoline to methanol has already proven simple and cheap. Switching would result in large financial savings to US citizens, as well as improvements in US security because methanol production is free of foreign control.

As for electricity generation, he described natural gas as much cheaper than coal, less polluting, and useful enough until large, inexpensive, relatively low-tech batteries are developed to store excess daytime solar energy at distributed locations for night-time use.

Woolsey, a Venture Partner of Lux Capital Management, spoke at a talk sponsored by Sandia's National Security Speakers Series and the Climate Security Program.

Rather than present himself as a visiting eminence, Woolsey used self-deprecating humor to break down any barriers between himself and his technical Sandia audience. "After being a Washington lawyer for 22 years," he said, "I'm surprised at being invited into any polite company."

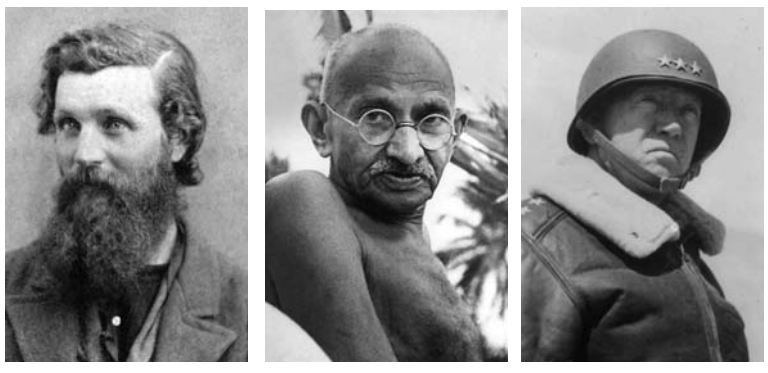
Informed by his security people that the new CIA director must travel under an alias on a commercial airline flight, his first unhappy thought was, "Aw, there go the frequent-flier miles!" The comment drew a wave of sympathetic audience laughter.

Getting off the plane after being seated incognito between two large security professionals for 6.5 hours, Woolsey was told that a flight attendant remarked, "I've been on these flights 20 years, and that's the politest and best behaved prisoner we've ever had." It was, Woolsey remarked wryly, his first successful "covert op."

Speaking to the theme of his talk, "Energy in the 21st Century: Could Muir, Patton, and Gandhi Agree on a Program?" Woolsey said he arrived at his conclusions on electrical energy by "channeling" the outlooks of environmentalist John Muir, Gen. George Patton, and pacifist political leader Mahatma Gandhi. These — "the most remarkable [people] of the last 150 years" — he used as imaginary checkpoints for the environment, defense, and the very poor of the world.

For example, he said, Muir would favor nuclear power because it's clean, but Gandhi would think it of no help to his constituents — "the bottom billion and a half of the world's population" — and Patton would hate it.

Gandhi would say, as Woolsey envisioned it, "We don't have electricity in little villages and we're not going to get it there with big power plants and networks." Patton would advise, "Don't be a Johnny Appleseed for nuclear weapons." That is, peaceful nuclear technology would help less-advanced nations move in the direction of nuclear weapons.



AN UNLIKELY TRIO, environmental pioneer John Muir, peace activist and Indian leader Mahatma Gandhi, and Gen. George Patton, provide ways of looking at the world that James Woolsey finds useful in thinking about the nation's energy challenges. (All photos from Wikipedia in the public domain)

Solar, on the other hand, allows for distributed generation of electricity, which would be fine with Gandhi because it could electrify remote villages. It's environmentally clean, so Muir would like it. Patton would advise, "What I like about distributed solar is that it has security and military utility. It's resilient against terrorist attacks, impervious to electromagnetic pulses, and unavailable for system-wide hacking."

Said Woolsey, "My three ghosts agree that that world isn't there yet, but solar has moved rapidly: under a dollar a watt for solar panels. There are complexities in solar, there are bankruptcies, but the direction is good. What we don't have is batteries. People are starting to realize it's not a sports car's lithium ion batteries that are needed but maybe big ugly cheap safe things you put in the basement and store what you collect in the daytime, some of it, to be used at night."

Securing the availability of electricity is important, he commented, because "there are 18 critical infrastructures in the US and 17 of them rely on electricity. If [the electrical grid] goes down, you're back in the 1880s and you don't have enough water pumps."

As for powering the US electric web until solar is ready to do the job, he said that Muir would want to reduce the use of coal in favor of natural gas because "it's not ideal but emits half the CO2." Muir might favor burning cleaned-up ("scrubbed") coal, but removing unwanted effluents and capturing and sequestering carbon make coal twice as expensive as natural gas.

While Muir would prefer renewables, he would find wind turbines unsightly.

Furthermore, Woolsey said, "Since less than 1 percent of US electric power comes from oil, if you're building a wind farm or solar panels, you're not doing a thing about our dependence on oil."

In his passion to get America off the oil standard for transportation — "We borrow a billion dollars a day to import oil; we're paying for our enemies to come up with ways to attack us" — he turned to economists Adam Smith, Frederick Hayek, and Milton Friedman, who would say that "The greatest danger to a free economy is a cartel, and the most important job of government is to break the cartel."

Since, he said, OPEC has 78 percent of the world's oil reserve and sells only one-third of it to keep the price up, "I would say they were a conspiracy in restraint of trade, a cartel. I would say that a cartel nested inside a monopoly is driving us crazy."

His solution is to "re-label the middle pump at gasoline stations to put methanol in there. It's very simple. Move toward new fuels while working off methanol. It's the same as moving from leaded to unleaded gas. It's not difficult. It's the wave of the future, like batteries for solar."

Converting a car to run on methanol incurs a one-time cost of less than $100, he said, and experiences in other countries show vehicles run reliably after the conversion.

After Woolsey concluded, Sandia President and Labs Director Paul Hommert thanked him and pointed out that, other than an introductory title slide, Woolsey used no further PowerPoint.

"I'm impressed by a man who can hold your attention for an hour with a single slide. I don't have that skill," Paul said modestly.

Keeping up a family tradition, David Wick becomes an SPIE Fellow

Following in his father's footsteps, David Wick (1931) has been named a Fellow of SPIE, the international society for optics and photonics. David was one of 75 new Fellows named this year to the professional society that serves 225,000 constituents in 150 countries. He was recognized for achievements in deformable mirrors and MEMS optical devices for optical correction and imaging.

In 2008, David, then a member of the SPIE Board of Directors, officially presented the Fellow plaque to his father, Raymond, who was honored for his contributions to the advancement of laser technology. At this year's SPIE Optics+Photonics conference in August, Raymond presented the Fellow plaque to his son.

In honoring David as a Fellow of the society, SPIE noted that his contributions to active optics have been "significant and many." His contributions to foveated imaging, in which an active device such as a MEMS mirror or spatial light modulator is used to correct field-dependent aberrations, is "particularly notable," SPIE said.

David has worked at Sandia for 13 years. He served as a distinguished member of technical staff in Integrated Military Systems, and recently moved to the Partnerships group as a licensing executive. Prior to coming to Sandia, he spent nine years working in R&D at the Air Force Research Laboratory, where his father Raymond spent most of his career. David's technical efforts have primarily focused on imaging systems for military platforms, working on applications including wavefront control/correction, phase conjugation, beam steering, and optical correlation. He has three patents and more than 50 technical articles to his credit.

Regarding his new role as a licensing executive, David says, "This opportunity came up, and I decided to try something completely different. The most exciting part for me is that I'm getting exposed to a number of technical areas that are completely new, so I'm learning a lot.

"I do think there is an opportunity to really make a difference in this organization. Actually, licensing is only a small part of what I do. I really consider my job to be helping our technical staff to see their scientific achievements realized in the outside world. As part of that transition process, I hope to get them the credit they deserve for their work and to generate funding to help them develop the next great technical advance."

Following this year's Fellow presentation, David says, his father asked him, "So do you think Tracey or Elyse [David's children] will carry on this tradition?" Maybe, David says. "My son, Tracey, is a freshman in high school and my daughter, Elyse, is in 6th grade, so we have a long way to go."

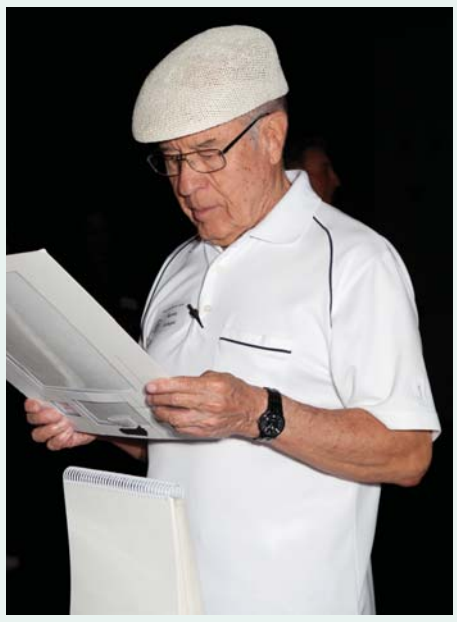
LIKE FATHER, LIKE SON — David Wick (1931), right, in 2008 as a member of the SPIE board of directors, presented his father, Raymond, with a certificate naming him a Fellow of the professional society for photonics and optics. This year at the society's annual Optics+Photonics Conference, David's father returned the gesture, presenting David the certificate naming him as one of 75 new SPIE Fellows inducted in 2012.

Retirees reconnect

Annual Retiree Social offers opportunity to reminisce and get reacquainted

Photos by Lloyd Wilson

More than 1,400 Sandia retirees and their guests attended the 2012 Retiree Social in early September, held for the first time at the Albuquerque Convention Center. This was the largest attendance on record for the event. Because the Convention Center is one of the only facilities in Albuquerque that can accommodate a group of this size, it will likely be the venue of choice in the future. Deputy Labs Director and Executive VP for National Security Programs Jerry McDowell and Health, Benefits, and Employee Services Center 3300 Director Rob Nelson, addressed the enthusiastic audience. According to surveys, the event was a huge success, with respondents saying they can't wait for next year.



Valuing the power of feminine traits in the workplace

Society of Women Engineers hosts 'skirt strategist' speaker

By Neal Singer

In a side room of a pizza parlor on Wyoming Boulevard, self-described "skirt strategist" and team-building consultant Katie Snapp explained to a local section of the Society of Women Engineers (SWE) why its members should value the power of feminine traits in the workplace.

KATIE SNAPP

Introduced by section president Stephanie Wenner, who held a baby in her arms, Snapp spoke to an audience of 22 women, approximately one-third of whom were Sandians.

She said that "Research shows that at work, men believe women need to act like a man to be taken seriously, so we bury our natural instincts . . . and take on the leadership traits of the majority."

Snapp said that "When women make decisions, we're good at doing it collaboratively, and . . . collaboration can be very rich. Men see they would not do it that way so [they think that] women must not know what they're doing."

But women see things holistically, Snapp said, and operate best from what she described as four feminine strengths: empathizing, building relationships, sensing undercurrents, and social equity — recognizing people's value in the workplace regardless of their titles.

"We communicate in the hallway [to build relationships]," she said. "Men think it's empty banter but for us it's the way we communicate."

In sensing undercurrents, she said, "A man might come out of a meeting and say, 'I think that meeting went well.' A woman might say, 'I saw some non-verbals that indicated differently."

Empathy, she said, should not be considered helpless sympathy but rather a gentler way of encouraging performance. As an example, she said, a woman might say to a consistently late employee, "I know how hard it is to get here with the heavy traffic, but try to do better."

People interested in the effectiveness of women in management positions might check the Fortune 500 listings of top corporations, she said: "The highest ranked companies in return on equity have the highest number of women [in leadership positions]. It's better for a company to have women in higher places to influence it."

She urged women to "remember that if you have technical knowledge, you have influence."

A chart requiring self-analysis of 16 leadership traits — among them, "Big Picture Thinking," "Planning," and "Inspiring" — was the most valuable part of the meeting to Elizabeth Lopez (2144). "The chart helped me understand my own traits and made me more aware of why I might do the things I do."

Snapp, a former electrical engineer at Honeywell, lists General Dynamics, Northrop Grumman, and the US Navy and Air Force among her clients for previous work in a team-building consultant group. In an email to *Lab News*, she mentions she held a Sandia engineering residency in 1987-1988 in the weapons program, where she did telemetry work and reported to Dave Bray.

Further information on SWE is available at www.swe.org.

Sandia celebrates Hispanic Heritage

More than 600 people come out to Hardin Field for popular annual event

More than 600 people came out to Hardin Field Oct. 11 for the Hispanic Heritage Month Diversity Awareness Event. Attendees enjoyed cuisine from Garcia's Kitchen (and from the 40 entries in the salsa contest) and live entertainment by the Abel Lucero Band and the choir from the Public Academy for Performing Arts (PAPA).

The keynote address, by Brig. Gen. Andrew Salas, the Adjutant General of the New Mexico National Guard, was dynamic and highly inspirational.

A traditional highlight of the annual event, the Youth Art Contest, attracted participants from schools throughout the Albuquerque area. Winners this year in the High School category were: Ana Oaxaca of Rio Grande HS (first place); Angel Pavia, Rio Grande HS, 2nd place; Karissa Molina, Volcano Vista HS, (3rd place); and Shannon Jones, Rio Grande High School (honorable mention). In the Middle School category the winners were: Lauren Donahue, Desert Ridge Middle School (first place); Joshua Ward, Kings Highway Homeschool (2nd place); Alicia Ulibarri, St. Charles Borromeo School (3rd place); and Tyger Williamson, Polk Middle School (honorable mention). Elementary School winners were Danielle Genero, Adobe Acres Elementary (first place); Carolina Centenera, Desert Willow Family School (2nd place); Elizabeth Enos, Annunciation Catholic School (3rd place) and, Isabella Nuanez, Longfellow Elementary School (honorable mention).

STUDENTS from the choir from the Public Academy for Performing Arts entertain attendees at the 2012 Hispanic Heritage Month celebration. (Photo by Randy Montoya)

Some 60 individuals from Sandia, Kirtland Air Force Base (KAFB), DOE, SSO and NNSA were involved in the event planning, with several organizations from Sandia, including Environmental Management and the Facilities Maintenance and Operations Center (FMOC) providing key support. The planning leads for the event were Tito Irizarry (10625), Rebecca Lopez (4826), and Erika Barraza (4821).

Senior leadership from the sponsoring organizations actively involved in the planning included KAFB commander Col. John Kubinec; NNSA Sandia Site Office Manager Geoff Beausoleil, and Sandia HR and Communications Div. 3000 VP Pam Hansen Hargan, whom is also the Hispanic Leadership Outreach Committee executive champion.

WINNERS IN THE YOUTH ART CONTEST pose with their winning entries. (Photo by Randy Montoya)

Retiree Nigel Hey's autobiography, Wonderment, offers insights into a fascinating life well-lived

By Neal Singer

One might argue that it takes a certain presumption to write an autobiography in 21st century America without being a celebrity to begin with. Why would anyone care?

But British-born, American-schooled, and Sandia-retired author Nigel Hey describes in *Wonderment* the passage of his 76 years with a clarity and insight, a love of words, and a unique sensibility that makes the book hard to put down.

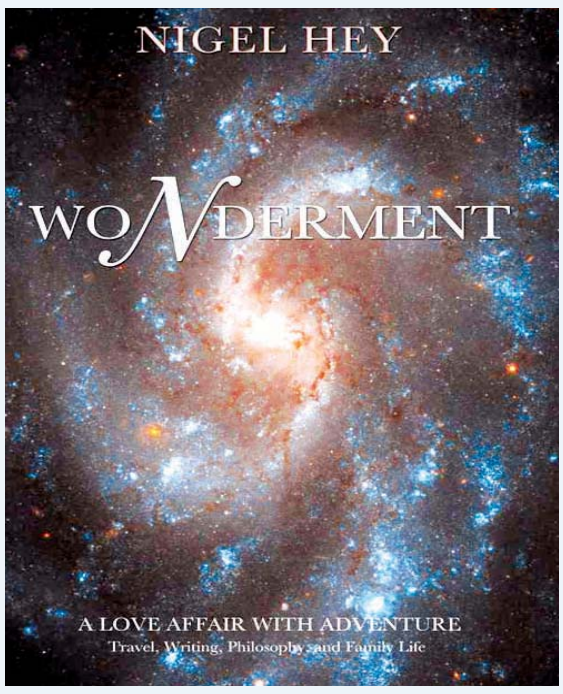
NIGEL HEY

Take a look at his language. He describes being fascinated by "the beauty of fallen leaves that had transformed into delicate skeletal designs, and by seeing brilliant autumn leaves against a backdrop of smoky clouds." He breathed — "especially if no one was looking" — directly onto plants, where he "imagined the geraniums invigorated by that gentle gift of carbon dioxide, and reflected that very likely the geraniums reciprocated with an unthinking, microscopic, quid-pro-quo gift of oxygen.

"Call it madness," he writes, "but I could afford the whim, I enjoyed the eccentric moment, and it harmed no one."

As for his take on modern life, what he says has been said by others, but has anyone said it better? "I suspect that the products of information technologies that range from TV natural-history documentaries to computer modelling of natural events are coaxing people away from the existential delight of knowing nature in 5-D: by literally being there, and enchanted in the collusion of our full suite of senses."

He carries this kind of gentle insight into his life as a writer and publicist, working in Salt Lake City, Bermuda, London, and the American Southwest, where his adventures among the Indians and as a science writer and publicist at Sandia succeed each other like the pretty, unexpected changes of a kaleidoscope. Into the mix, Hey is unafraid to introduce descriptions of two failed marriages and a happy third, and he does it on an introspective level that, if emulated, could improve the drab spitefulness of most writings about marital breakups.



"It is a tragedy," he writes about one of his divorced wives, an actor, drama teacher, and playwright, "that this talent did not attract the recognition it deserved."

Also in the mix are his successful struggles to write his previous book (his fifth) about the Reagan "Star Wars" years. The writing led him to Russia without an interpreter to interview key Russian scientists for their "take" on the US effort to develop a shield against nuclear attack.

Last but not least, Hey details his love for each of his three children.

That's a lot of ground to cover in one book. Hey does it well.

For information about the availability of *Wonderment*, go to www.nigelhey.com.